ON SOME TERMITES COLLECTED BY MR. GREEN IN CEYLON.*

By Dr. NILS HOLMGREN, Stockholm.

I HAVE, on several occasions, received termites for determination from Mr. E. E. Green, of Peradeniya.

These very valuable collections contained several new species in addition to others that were already well known, but of which our knowledge has been amplified by the discovery of hitherto unknown castes.

Hereunder I will deal with the following species and castes that are new to Ceylon or to Science :—

Calotermes (*Neotermes*) *militaris*, Desn. Imago.
Calotermes (*Glyptotermes*) *dilatatus*, Bung. Imago.
Calotermes (*Glyptotermes*) *ceylonicus*, Holmgr. Imago and soldier.
Termes estheræ, Desn. New to Ceylon.
Odontotermes horni, Wasm. Imago.
Odontotermes ceylonicus, Wasm. Imago.
Odontotermes obscuriceps, Wasm. Imago.
Eutermes lacustris, Bugn. Soldier and worker.
Eutermes longicornis, n. sp. Soldier and worker.
Microcerotermes bugnioni, Holmgr. Imago.
Microcerotermes greeni, n. sp. Soldier and worker.

CALOTERMES (NEOTERMES) MILITARIS, Desneux.

Imago :—Reddish brown, with lighter coloured antennæ, pleuræ, coxæ, femora, and abdominal sternites. Tibiæ and tarsi reddish brown. Wings (rust coloured) yellow brown, smooth, sparsely covered with hair.

Head broadly oval, thick when looked at from the side, moderately arched, with somewhat impressed forehead. Compound eyes rather small, ocelli small, almost touching the eyes. Basal portion of clypeus very short, of the same colour as the forehead, quite flat. Apical portion of clypeus trapezoidal, white. Upper lip somewhat broader than long. Mandible armed as in *Hodotermes*. Antennæ with eighteen or nineteen joints. In the case of those with eighteen, the second, third, and fourth are of equal length. When there are nineteen joints, second and third are equal and the fourth shorter.

Pronotum much broader than the head; anterior border strongly concave, distinctly shorter than the hinder border. Posterior angles more strongly rounded than the anterior angles. Mesonotum and metanotum straight behind, hardly rounded. Basal pads ("Schuppen") of the fore wings very large, with rather convex costal margin and bowed hinder margin; ribs prominent. Wing membrane thickly covered with minute prominences. Subcosta and radius of fore wing fairly well developed. Radius-sector with from six to seven branches to the front edge of the wing; the first branch proceeding from the inner third of the wing. Mediana free from the base of the wing, with from six to eight radius-sector connections, often with a backwardly directed branch at the extremity. Interspace between the mediana and the cubitus reticulated. The five to seven inner branches of the cubitus well defined; the remainder (ten to twelve*) weaker.

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* Translated from the German.

The mediana of the hind wing extends almost from the base of the radius-sector.

All the tibiæ with three apical teeth; the middle tibiæ with one or two additional lateral teeth. Onychium small.

Length, with wings, 17 mm.
Length, without wings, 10 to 12 mm.
Length of head, 2·5 to 2·7 mm.
Breadth of head, 2 mm.
Width of pronotum, 3 mm.

Locality, Peradeniya. (Coll. Green, No. 2,452.)

CALOTERMES (GLYPTOTERMES) DILATATUS, Bugn.

(nec *Calotermes ceylonicus*, Holmgr.)

Imago (apterous form):—Brownish yellow; head and pronotum somewhat darker; lower parts whitish yellow. Hair very scanty.

Head broadly oval, somewhat longer than broad. Head sutures hardly visible. Compound eyes rather small, slightly protuberant. Ocelli almost touching the eyes. Mandibular condyle large. Basal portion of clypeus short. Upper lip small, strongly bent. Antennæ ?-jointed, third joint somewhat smaller than second and as long as fourth.

Pronotum with somewhat widely rounded fore-angles, and with unindented anterior margin. Mesonotum and metanotum obscurely excavate.

Length, without wings, 6 mm.
Length of head, 1·44 mm.
Width of head, 1·26 mm.
Width of pronotum, 1·07 mm.
Length of pronotum, 0·59 mm.
Locality, Peradeniya.

Remarks.—The imago described as *Calotermes ceylonicus*, Holmgren (Escherich, "Termitenleben auf Ceylon"), does not belong to *C. dilatatus*, Bugnion, as I once supposed (Zool. Anz., 1911).

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* There are about eleven principal branches to the cubitus, but these are much subdivided, especially on the distal part of the wing.

CALOTERMES (GLYPTOTERMES) CEYLONICUS, Holmgr.

Calotermes ceylonicus, Holmgren (Escherich, " Termitenleben auf Ceylon ").

Imago :—Yellowish brown to brown. Below, straw-yellow. Wings hyaline with brown veins. Pronotum with a T-shaped yellow mark.

Hair very scanty.

Head quadrate-oval, longer than broad, very thick, sloping somewhat towards the forehead. Sagittal suture very distinct. Compound eyes small, somewhat protuberant. Ocelli of medium size, almost touching the eyes, placed somewhat awry. Basal portion of clypeus very short; upper lip small, sharply bent. Antennæ 13-jointed, third about as long as second and a trifle longer than the fourth. Pronotum rather smaller than the head, with acutely rounded angles in front (" Vorderecken beinahe spitzwinkelig abgerundet "). Metanotum somewhat rounded behind. Wing membrane verrucose (" hockerig "). Subcosta of the fore wing rudimentary. Radius short. Cubitus very feebly defined, with from ten to twelve branches :—

	Smaller Form.	Larger Form.
Length, with wings ..	8·5 mm. ..	—
Length, without wings ..	4·7 mm. ..	6 mm.
Length of fore wing ..	7·3 mm. ..	—
Length of head ..	1·33 mm. ..	1·48 mm.
Width of head ..	1·15 mm. ..	1·26 mm.
Width of pronotum ..	0·96 mm. ..	1·18 mm.
Length of pronotum ..	0·52 mm. ..	0·7 mm.

Soldier :—Head yellowish red, brown towards the front ; mandible brown at base ; body straw-yellow. Hair very scanty.

Head approximately cylindrical, much longer than broad. Forehead sharply receding, medially impressed, bilobed, rounded at the sides. Basal portion of clypeus short. Upper lip reaching beyond the middle of the closed mandibles, longer than broad. Mandible very short and broad, strongly toothed. Antennæ 12-jointed, short ; third joint very short.

Pronotum smaller than the head, half-moon shaped ; anterior margin concave, posterior margin slightly excavated in the middle. Abdomen somewhat extended.

Length of body, 6·5 to 7 mm.
Head, with mandibles, 3·22 mm.
Head, without mandibles, 2·55 mm.
Width of head, 1·52 mm.
Width of pronotum, 1·39 mm.
Length of pronotum, 0·63 mm.

The collection contains many larvæ and nymphs.

Locality, Peradeniya.

Remarks.—The imagines of *C. ceylonicus* and *dilatatus* are very similar to each other, but may be distinguished by the following characters :—

(1) Pronotum with almost rectangular slightly rounded angles in front. Sagittal suture of head very well defined ; darker.—*C. ceylonicus*, Holmgr.

(2) Pronotum with broadly rounded angles in front. Sagittal suture of head ill-defined ; paler.—*C. dilatatus*, Bugn.

TERMES ESTHERÆ, Desn.

Soldiers and workers present.

Locality, Hambantota (A. J. MacDougall).

Remarks.—This species is now recorded from Ceylon for the first time. Desneux described it from the Bijapur District (Bombay Presidency).

ODONTOTERMES HORNI, Wasm.

Syn. *Termes peradeniyæ*, Holmgren. "Termitenleben auf Ceylon," K. Escherich, p. 197.

Syn. (?) *Termes taprobanes*, Hag. According to Ceylon examples of Hagen, Wasmann.

The imago of this species, which is common at Peradeniya, has been hitherto unknown. Mr. Green has now obtained imagines. They are identical with specimens from the collections of the Vienna Hof-Museum, which I have described as *T. peradeniyæ*.

Probably *T. taprobanes*, from Ceylon, is also identical with *O. horni*.

Locality, Peradeniya ; Koslanda. In branches of *Croton tiglium.*

ODONTOTERMES CEYLONICUS, Wasm.

Imago :—Head bright castaneous : area surrounding the fontanelle, anterior angles of the "transverse band," basal portion of clypeus, antennæ, and mouth parts reddish yellow. Pronotum of the same colour as the head, with a T-shaped mark, shoulder spots, and two posterior spots yellow. Front part of the meso- and metanotum paler than the hinder parts. Wings brownish. Abdomen brown above, rusty yellow below. Legs rusty yellow.

Hair rather dense, yellowish.

Head large, broadly oval. Fontanelle small, elevated. Compound eyes of medium size, decidedly prominent. Ocelli large, distant from the eyes by about their greater diameter. "Transverse band" medially excavated, narrow, uneven. Basal portion of clypeus large, rather shorter than half its own width, strongly swollen, convex behind, straight in front. Antennæ 19-jointed, second longer than third, fourth somewhat longer than third but shorter than second.

Pronotum wide, with broadly rounded anterior angles, lateral margins converging strongly behind, posterior margin slightly excavated in the middle. Mesonotum more broadly excised behind than the metanotum. Wing membrane minutely punctate, sparsely hairy at the extremity, with a yellow subcostal streak. Radius-sector with some short backwardly directed branches. Mediana extending from the cubitus, with one, two, four, or six apical branches, and often with some slender branches united to the radius-sector. Cubitus with about sixteen branches, of which about the seven innermost are thickened. Cerci present in the male.

Length, with wings, 27 mm.
Length, without wings, 12 to 13 mm.
Length of fore wing, 12·5 mm.
Length of head, 2·7 mm.
Width of head, 2·59 mm.
Length of pronotum, 1·29 mm.
Breadth of pronotum, 2·52 mm.

Locality, Peradeniya.

Remarks.—*O. ceylonicus* is readily distinguishable from other Ceylon species by the extensive yellow area surrounding the fontanelle.

ODONTOTERMES OBSCURICEPS, Wasm.

Imago :—Head dark castaneous. Fontanelle, two spots, and the anterior angles of the front margin of the " transverse band " rusty yellow. Basal portion of clypeus brownish. Antennæ brownish ; mouth parts rusty yellow. A T-shaped mark and two shoulder spots on the pronotum yellow. Fore parts of the meso- and metanotum paler than the hind parts. Dorsal surface of abdomen brown ; ventral surface, especially in the middle, much paler. Tibiæ brownish. Wings yellowish brown, with brown veins. A yellow subcostal line is present.

Hair " fairly plentiful." The head partly with short hairs and partly with longer bristles.

Head broadly oval, narrowed in front. Area surrounding the fontanelle strongly impressed. Fontanelle small, punctiform, with a small longitudinal elevation in front of it. Compound eyes of medium size, decidedly prominent. Ocelli fairly large, with a raised inner edge : distant from the eyes by about their longer diameter. Basal portion of clypeus large, distended, rather shorter than half its width, convex behind, straight in front. Antennæ 19-jointed ; third shorter than second ; fourth rather longer than third, but shorter than second ; fifth as long as third.

Pronotum moderately broad, with broadly rounded fore-angles ; a slight median notch in front, widely excavated behind. Mesonotum more broadly notched than the metanotum. Wings moderately broad : membrane, finely punctate, sparsely hairy towards the tip. Radius-sector sometimes with a " hind rib " ; also with short backwardly directed branches. Mediana, even before the middle, divided into about eight branches. Cubitus with from twelve to sixteen branches, of which about the seven innermost are thicker than the others.

Length, with wings, 26 to 27 mm.
Length, without wings, 10 to 12 mm.
Length of fore wing, 22, 23, or 24 mm.
Length of head, 24 mm.
Width of head, 2·22 mm.
Length of pronotum, 1·04 mm.
Width of pronotum, 2·07 mm.

Locality, Peradeniya.

Remarks.—It is curious that in the literature dealing with Termites a complete description of *Odontotermes obscuriceps*, Wasm., appears to be wanting, in spite of the fact that this is one of the commonest of Ceylon species.

EUTERMES LACUSTRIS,* Bugn.

Soldier :—Head dark brown ; antennæ, thoracic plates, and abdominal tergites paler brown ; legs and abdominal sternites straw yellow.

Head with only a few scattered setæ. Abdominal tergites minutely hairy, with a feebly developed row of setæ behind. Sternites with longer hair and setæ.

Head (without the process) seen from above circular ; profile of forehead almost completely straight, or almost imperceptibly concave. Process conical, of medium length. Antennæ 13-jointed ; second as long as third ; fourth smallest.

Pronotum short, with short strongly elevated anterior lobes ; entire. Mesonotum somewhat narrower than the metanotum, the latter slightly excavated behind. Fourth joint of tarsus produced in the form of a spine.

Length of body, 3 to 3·5 mm.
Length of head, 1·63 mm.
Width of head, 1·05 mm.

Worker :—Head brown, body tergites slightly brown ; sutures of head, anterior edge of the "transverse band," clypeus, sides of head and the remaining parts of the body whitish straw-coloured. Head with only scanty short hair. Abdominal tergites with fine short hair and a feebly developed row of setæ behind. Head approximately quadrate, with strongly rounded angles, longer than broad. Sutures of head very distinct, moderately wide. Clypeus with a short base, which scarcely touches the mandibular condyles. Mandibular condyles rather large. Apex of clypeus hyaline. Upper lip rather small, broader than long. Antennae 14-jointed ; second slightly longer than third ; fourth smallest. Pronotum strongly convex ; anterior lobes as long as the hinder part, very slightly excavated (or entire).

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* This was originally described by Dr. Holmgren as a new species, *Eutermes greeni ;* but, since the submittal of his manuscript, a description of the same species has been published by Dr. Bugnion, under the name of *Eutermes lacustris.* Dr. Bugnion's name, therefore, takes precedence. The correction has been authorized by Dr. Holmgren.—E. E. G.

Length of body, 4 mm.	Width of head, 1·03 mm.
Length of head, 1·3 mm.	Width of pronotum, 0·61 mm.

Locality, Peradeniya.

EUTERMES LONGICORNIS, n. sp.

Soldier :—Head brownish yellow, frontal process more decidedly brown ; antennæ rusty yellow ; abdominal tergites brown ; body, in other respects, yellowish white. Smooth, with a few setæ on the hinder margins of the abdominal tergites. Head pear-shaped, not constricted ("eingeschnürt"). Frontal process slender, about as long as the rest of the head. Profile of forehead concave, the frontal process and the crown of the head not lying in the same plane. Antennæ long, 13-jointed ; third at least twice as long as second and distinctly longer than fourth. Pronotum saddle-shaped, not excavated in front.

Length of body, 2·75 mm.
Length of head, 1·66 mm.
Length of frontal process, 0·74 mm.
Width of head, 0·92 mm.
Width of pronotum, 0·44 mm.

Worker :—Head light brown, with white sutures and fontanelle. Basal portion of clypeus and anterior border of "transverse band" yellowish. Tergites brown : remainder of body yellowish white. Head with a few setæ. Hair, in other respects, as in the soldiers.

Head broadly oval. Sutures clearly defined. Fontanelle triangular, situated in the sagittal suture. Base of clypeus short, rather narrow, somewhat arched. Antennæ rather long, slender, 15-jointed ; third joint as long as second and fourth together ; fifth as long as fourth ; other joints gradually increasing in length. Pronotum saddle-shaped, not excavated in front.

Length of body, 4·25 mm.	Width of head, 1·29 mm.
Length of head, 1·63 mm.	Width of pronotum, 0·67 mm.

Locality, Peradeniya, on stem of "Giant Bamboo."

Remarks.—Nearest to *Eutermes escherichi* of Ceylon.

MICROCEROTERMES BUGNIONI, Holmgren.

Imago :—Dark brown, lighter beneath. Clypeus, antennæ, mouth parts and legs rusty yellow ; wings dark. Hair short and fine.

Head oval, longer than broad, approximately parallel-sided, thick. Compound eyes small and prominent. Ocelli rather small but not punctiform ; scarcely less distant from the eyes than their diameter. Fontanelle imperceptible, but actually present. Basal portion of the clypeus large, almost triangular behind, straight in front, somewhat distended. Antennæ 14-jointed, third very small.

Pronotum small, straight in front, anterior corners angularly rounded, lateral margin strongly convergent; posterior margin relatively short, obscurely excavated in the middle. Mesonotum distinct. Metanotum very slightly excised. Front wing-pads distinctly longer than the hinder ones, but not reaching the base of same. The mediana of the fore wing arises free from the pad, and runs nearer to the cubitus than to the radius-sector. Mediana simple or furcate, or with two or three branches. Cubitus with eight or nine branches, of which most are furcate. Six or seven stout inner nervures. The mediana of hind wing starts from the radius-sector.

Length, with wings, 7·5 mm.	Width of head, 0·84 mm.
Length, without wings, 4 mm.	Length of pronotum, 0·43 mm.
Length of head, 0·91 mm.	Width of pronotum, 0·65 mm.

Locality, Ambalangoda.

MICROCEROTERMES GREENI, n. sp.

Soldier :—Head yellowish brown ; body straw-yellow, whitish ; head very sparsely hairy.

Head elongated, parallel-sided. Forehead somewhat truncated, "rinderformig"-shaped, impressed. Basal portion of clypeus distinctly convex behind, with straight anterior border. Upper lip roundly pentagonal. Fontanelle small. Transverse sutures distinct. Mandible decidedly concave externally at the base. Mandibles relatively short, with very distinctly serrate teeth, the tips falcate. Antennæ 13-jointed; second as long as third and fourth together; third very short. Pronotum small, saddle-shaped, not excised in front.

Length of body, 4·20 to 4·25 mm.
Length of head, with mandibles, 1·85 mm.
Length of head, without mandibles, 1·37 mm.
Width of head, 0·81 mm.
Width of pronotum, 0·52 mm.

Worker (two forms):—Head yellow ; body yellowish white. Hair scanty. Head broadly oval. Fontanelle not visible. Basal portion of clypeus large, arched in front, fleshy, rather longer than half its breadth, distinctly convex behind, straight in front. Antennæ 13-jointed; second as long as third and fourth together; third very short. Pronotum saddle-shaped, not excised in front.

	Small Form.	Large Form.
Length of body ..	2·5 mm. ..	3 mm.
Length of head ..	0·78 mm. ..	0·81 mm.
Width of head ..	0·67 mm. ..	0·7 mm.
Width of pronotum ..	0·44 mm. ..	0·48 mm.

Locality, Ambalangoda.

SOME SUGGESTIONS FOR MEMBERS OF THE CEYLON NATURAL HISTORY SOCIETY.*

By E. Ernest Green, F.E.S., F.Z.S.,
Government Entomologist.

OUR Natural History Society, which was inaugurated just eight months ago, now numbers 157 members.

This is our third meeting, and we have already listened to several interesting Papers on various subjects. We look forward to many other meetings; but the object at which such a Society as ours should aim is not merely to meet at stated intervals and listen to the reading of Papers by a small number of our members. The actual meetings are the least important part of the programme. The life of the Society depends upon the endeavours of each individual member to add (if only a few grains) to the general stock of knowledge. The source of such knowledge is to be looked for, not at the meetings—though fresh ideas and inspiration may possibly be gathered on those occasions—but in the intelligent observation of Nature day by day.

Let no one, even the veriest beginner, be alarmed or discouraged by this dictum, or imagine that no valuable discoveries can be made without special training; nor must it be supposed that little remains to be discovered. Far from such being the case, endless problems, in every branch of Natural History, in Ceylon, await solution.

Speaking as an entomologist, I can confidently affirm that little is known about the life-histories and habits of our Ceylon insects. As soon as we get outside one or two conspicuous families—such as the butterflies and moths—it is probable that not one-tenth of the existing number of species has even been recognized, much less determined or classified, and our ignorance of their habits is discouragingly profound. Even amongst the butterflies, which have been collected assiduously ever since the British occupation of the Island, new species are still occasionally brought to light, and of many well-known species the early stages are yet unknown. The blank spots in our knowledge of the moths are still more numerous; and when we come to the other groups of insects, we seem to have scarcely touched the fringe of the subject.

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* Read before the Ceylon Natural History Society on Wednesday, October 9, 1912.

To show you what interesting facts may turn up unexpectedly, I may mention that, only a few months ago, one of my valued up-country correspondents sent me a very common beetle, and asked me if I knew that it was luminous in the dark. He had captured a specimen, one night, believing it to be an ordinary firefly, and was surprised to find that it was of quite a different form. Although I had been acquainted with this beetle—which is quite a common one—for many years, and had handled and examined many specimens of it, I was quite unaware of its phosphorescent properties. Systematic entomologists in Europe were apparently equally ignorant of the fact. Even when my attention had been drawn to the matter, I was unable, for some time, to corroborate the observation. I captured specimen after specimen and examined them in a dark room, without any result, except that my faith in my friend's accuracy began to wane. But I continued my investigations, and was rewarded one night in observing a very distinct phosphorescence emanating from a specimen captured on that afternoon. Moreover, I was still further interested to find that the light did not proceed only from the hinder extremity of the body, as is the case in common fireflies and glowworms, but was emitted from a definite series of points distributed along each side of the beetle. In fact, the insect displayed what looked like a row of illuminated portholes on each side of it. It would seem that this beetle is only occasionally luminous, though the conditions that govern its display are still obscure.

I have since discovered another beetle, hitherto unsuspected of producing light, that exhibits a similar series of phosphorescent points upon different parts of its body. The inference to be drawn from these interesting discoveries is that every unusual occurrence, or what appears to be unusual to the observer, should be duly reported and investigated. It may be already known ; it may lead to nothing. On the other hand, it may be a clue to some discovery of considerable scientific importance.

There must be countless unsuspected facts to reward the careful observer. There are many problems and undecided questions that any of you may be the means of solving. Let me mention a few.

Have we an indigenous hedgehog in Ceylon ? I fully believe that we have. There are five species recorded from the Indian continent, one of which—*Erinaceus micropus*—is common in the plains of Southern India ; but not a single species has been recorded from Ceylon. Yet I have been assured by competent observers that they have seen true hedgehogs in Ceylon. I have had a most circumstantial account from one man of how they were found in shallow burrows or runs beneath bushes, with the *débris* of insects upon which they had been feeding strewn round the entrance to their retreats. He had found them, more particularly, in the Eastern Province. I would appeal to our outstation members to settle this disputed question by submitting a living example of the animal, with full particulars of the circumstances of its capture.

Similarly, while the continent of India produces nine distinct species of "short-tailed field mice," or voles, not a single species is credited to Ceylon. As I pointed out in a recent number of *Spolia Zeylanica*, I am confident that we have at least one species of vole in the Island. I have myself seen what I believe to be one of these animals on the Horton Plains, and other competent observers have assured me that they have seen mice answering to this description. Not realizing the interest attaching to this matter, they have not troubled to capture and examine the animals. Who will acquire the credit of sending to the Colombo Museum the first specimen of a true Ceylon vole ?

For those who are interested in bird life, I would draw attention to the probable occurrence of an unsuspected bird in the hilly parts of Ceylon. I refer to one of the smallest of the hawk tribe, a falconet, three species of which are found in India. The first suggestion of the presence of such a bird came to me through a planter in Hewaheta, who described to me how he had seen two blackbirds fighting, and how one of them had killed the other and had flown away with it. I had, later, the good fortune to witness a similar occurrence myself. In this case the victim was a common "bulbul." I was attracted by its cries of distress, and came upon the scene just in time to see it disappearing over the trees in the clutches of a tiny dark-coloured hawk that looked no bigger than itself. Naturally, I had no gun with me, and so was unable to verify my observation. If our falconet is identical with one of the Indian species, it will probably prove to be *Microhierax fringillarius*, the smallest of the three, which ranges through the southern portion of Tenasserim, Malay Peninsula, Sumatra, Borneo, and Java. This species is said to feed more exclusively upon birds.

There is in Ceylon a carnivorous bat, the *Megaderma* (of which we have two species). When I say "carnivorous," I mean that it is not content with the insect fare of ordinary bats, but has a craving for real meat. Such animals as mice, small birds, lizards, and frogs are amongst its victims, and their remains can often be seen in the verandahs of our bungalows, below the spot where one of these bats has hung itself up to consume its prey. I have watched *Megaderma* flying low over the grass, in the dusk, evidently searching for lizards and frogs ; but it is difficult to understand how they effect the capture of the small birds that, to judge by their remains, form such a large part of the diet of this bloodthirsty vampire. Such birds usually roost in the depths of a bush, where—it might be thought—they would be well out of the reach of a bat, which requires open spaces for the employment of its wings. Does it scent out its sleeping prey, creep into the bush, and pounce upon it there ?

Who can tell us what is the normal food of the common land leech? Only a few of the myriads of these little pests can ever have the opportunity of tasting warm blood.

The actual destination of the periodical migratory flights of butterflies that are so conspicuous at certain seasons in Ceylon has never been properly worked out, and the object of this movement can only be guessed at. The solution of this problem would require an army of observers, stationed along the route of the migration.

What is the food of the common firefly? It has been suggested that they take no nourishment after attaining the adult winged stage. But if that is really the case, why are they provided with well-formed mouth-parts and jaws of a distinctly carnivorous type? In other insects, such as certain moths, that are known to take no food in the perfect state, the mouth-parts are rudimentary or completely atrophied. We know that the larvæ of fireflies and glowworms are carnivorous, subsisting upon slugs, snails, worms, and soft-bodied insects. But the firefly, in captivity, refuses such food. They may sometimes be seen congregated in thousands upon the foliage of some tree, but I have equally failed to tempt them with leaves or fruit, as might be expected from the structure of their mouths.

My endeavours to discover the breeding place of that unmitigated nuisance, the "eyefly," have, so far, been unavailing. I have been assured that they must breed in fruit, as they can frequently be seen swarming upon overripe plantains. But this assertion is due to an error of observation. The tiny flies that so constantly frequent such situations belong to quite a different family and species, whose life-history is well known to entomologists.

I could put endless other problems before you, but I have already said enough to show you that the possibilities of useful discovery that lie within your reach are by no means limited. We cannot have too many careful observers. There are so many problems to be solved, and so few to solve them.